Third United Nations International Conference on the Peaceful Uses of Atomic Energy

A/CONF.28/A/528
CZECHOSLOVAKIA
February 1964
Submitted in:
ENGLISH and RUSSIAN

Confidential until official release during Conference

Abstract

EXPERIMENTAL LOOP OF THE REACTOR KS-150

F. Klik, Zběhlík, Sklenička and Velechovský

The reactor design and the project of the first Czechoslovak nuclear power plant are being solved in such a way as to permit building in channels, cooling, circulating and auxiliary facilities of the experimental loop for the examination of new types of fuel elements in an individual circulating circuit.

The loop channel in the form of a Field tube will be built into the reactor periphery technology channel to replace a normal fuel element. The building in or loop channel removing assumes reactor stopping and gas coolant outletting but it does not require removing the cover of the pressure vessel. The reactor and power plant will be put into operation without the experimental loop. The building in the channel, including the loop equipment, is planned to be carried out after the initial operation will be started. Having ended the examination programme the loop channel may be removed from the reactor again and the normal technological channel with the fuel element inserted to its place.

The experimental loop has its individual circuit which is completely separated from that of the power plant. Only if carbon dioxide is used the gas system of the power plant will be used for filling and emptying the loop circuit. The basic equipment of the main circuit (blowers and gas-water heat exchangers) is doubled and sized for the full power, normally both units being operated at the same time so that loop cooling is not interrupted if one unit fails. In addition, a regeneration gas-gas heat exchanger and a filter for coolant purifying are built in the main circuit.

Generally transport technological facilities of the power plant will be used for handling both fresh and irradiated fuel elements examined. This

facility permits to remove the element or put it into the loop channel at full power, i.e. without shutting down the reactor and without interrupting the circulation in the main loop circuit.

After ending the irradiation the fuel element examined will be cooled in the reactor cooling zone and later in a special gas vessel. Its cooling will be assured by an auxiliary circuit equipped with particular blowers and heat exchangers.

The loop failure conditions were analyzed and such modifications have been performed in the project that it could not practically affect the reactor operation and would maximally limit the necessity of reactor shut down due to loop operation.

The loop will permit examining large fuel elements (diameter up to 65 cm, length up to 3.7 m) in a high neutron flux and under high thermal loads. The thermal loop output will attain up to 1.75 MW, coolant consumption up to 23 t/h and pressure gradient in the main circuit up to 20 kg/cm^2.

The channel design and loop project, its essential parameters and experimental capacity will be described in the report and the effect of this design on reactor and power plant operation are analyzed.